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Index to Contents, Page 4

Advertising Index, Page 33

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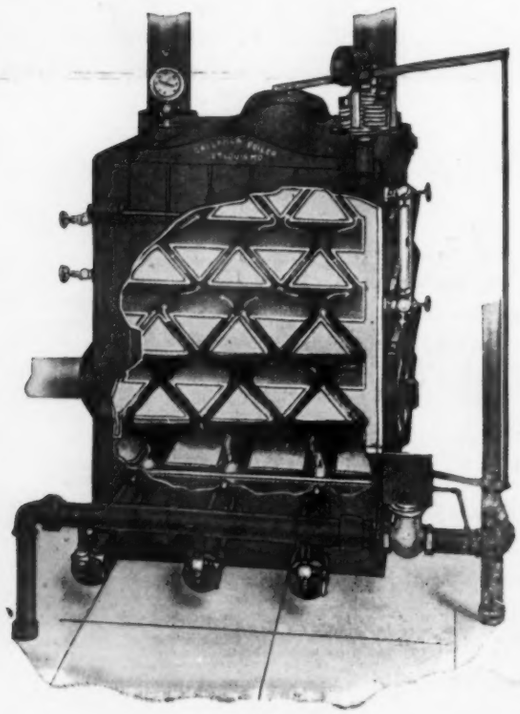

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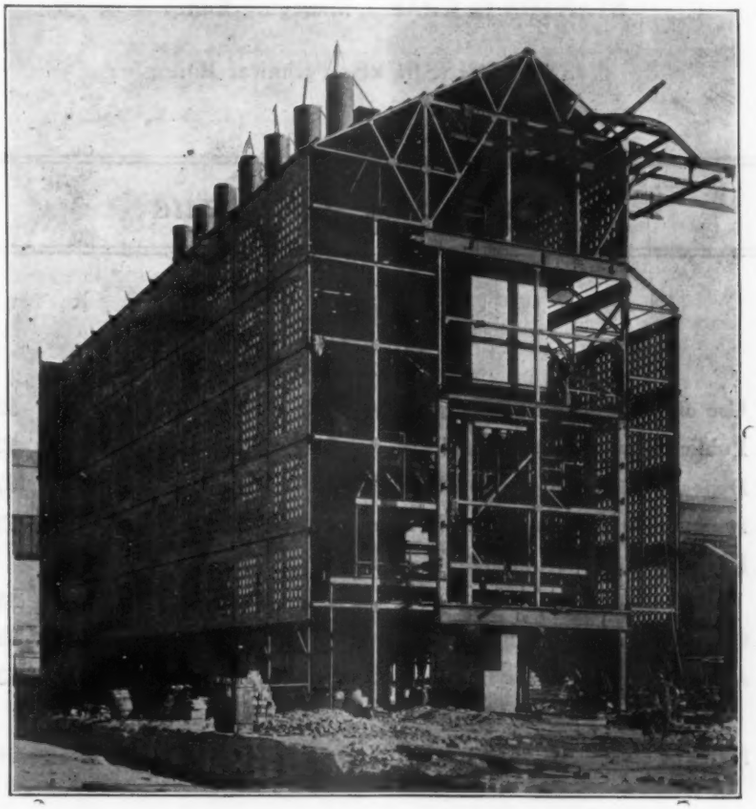

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American Gas Journal

SIXTY FIFTH YEAR

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Contents of This Issue

Use of City Gas for Cutting Steel—By J. H. Gumz 525

Public Relations and the Executive—By Frank R. Coats..... 528

Deposits in Gas Pipes and Meters—By Ralph L. Brown 530

Importance of Maintenance Department—By R. E. Pierce..... 532

Portable Pipe Wrapping Machine for Gas Pipes—
By Charles W. Geiger 533

Can Gas Pictures Tell the Story?—By Frank H. Madison 534

As the Journal Views It 535
An Industrial Gas Rate

News of the Gas Industry 542

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Use of City Gas for Cutting Steel

It has been used with success—Its advantages are many

J. H. Gumz

DURING the war a shortage of acetylene developed on the Pacific Coast and in a short time the situation was acute and the demand forced up the price. As numerous shipyards used this gas for cutting and trimming plates and beams in the construction of ships, it was not long before they decided that something had to be done if their building program was to be continued on schedule. It was natural, therefore, that city gas should have been considered as a substitute for acetylene, and it was but a short time before a torch was designed to utilize city gas as effectively as acetylene had ever been used.

With this torch available, a number of shipyards began using city gas for cutting, and found it so economical that when acetylene again became plentiful they continued to employ city gas in preference. All of these yards were supplied from high pressure distribution mains and the gas for cutting was piped direct from the meter at a pressure of approximately 25 pounds per square inch. This meant that a two-inch pipe was large enough for all the yard piping necessary for the cutters, as each torch used but a very small amount. A two-inch pipe 1,000 feet long with but a pound or two drop in pressure was of sufficient capacity to operate 20 torches simultaneously.

Very High Temperature Not Required in Cutting Operations

A great amount of newspaper publicity has been given to the intense heat of the "oxy-acetylene flame," cutting out the side of a sunken submarine, burning the steel beams in the Knickerbocker Theater disaster, and similar instances. Great stress is always laid on the intense heat generated by the oxy-acetylene or oxy-hydrogen flame, and the inference is made that this high temperature is necessary in the process, ordinarily referred to as cutting. Nothing is further from the truth. In no case is it necessary to heat the steel over 1300 deg. or 1400 deg. F. (a cherry red). Red hot iron will burn in the presence of oxygen just like wood or coal. A piece of steel can be heated over a blacksmith forge and a jet of oxygen will quickly cut or burn it in two without acetylene or other heating. What is necessary is the initial heating, that is, to heat the metal to the point where it will burn in oxygen, and this can be accomplished by city gas as well as by any other means. As the cutting or burning progresses, more and more heat is generated.

Some torch manufacturers, connected with producers of acetylene and hydrogen, have decided that it would not be good business for them to put a torch on the market which would use some other product than acetylene. In fact, they have hindered the development of the city gas cutting torch by the dissemination of reports that the latter could not be economically used for cutting. However, its use is continuing to increase, and no doubt all torch companies will shortly have city gas torches for sale.

Scrapping Battleships

As a result of the Four Power Pact, a number of battleships were scheduled to be scrapped, but it was decided to sell them rather than to sink them, as was done with the German fleet. There were but few bidders for the first of these ships put on sale, as ordinary wrecking methods would have shown a greater cost than the material could have been sold for as scrap.

One of the shipyards, that had been practically idle due to the cessation of ship construction, decided that it would attempt the work of scrapping some of these ships. The vessel was towed to the scrapping dock and all superstructure was rapidly cut away and then cutting was begun on the decking and armor. Pieces of armor weighing as much as 20 tons were cut loose and lifted onto land, where they were cut to a uni-

form size, suitable for charging in open hearth furnaces for reworking.

City Gas Overcomes Red Lead Difficulty

It was found in cutting the three-plate laminated protective decking that in places the red lead filler between the plates was one-quarter of an inch in thickness. This was seemingly too much for the oxy-acetylene torch to cut through, as it was observed, when making tests to determine the comparative speed and costs of cutting when using city gas in comparison with acetylene that the acetylene would mushroom out and fill in when the flame approached a considerable thickness of red lead. This was not experienced when using city gas and so far no satisfactory explanation of this phenomenon has been arrived at. Even with increased oxygen pressure, the same difficulty was experienced when using the acetylene torch. It was also noticed that the acetylene torch did not always make a clean cut, that is, a good deal of trouble was experienced when attempting to pick up a piece of plate with the crane. It would jam or refuse to budge, indicating that it was not entirely free, so that considerable time was required to free it. Even if the use of acetylene had been less in cost, the extra time and labor required would have made the total cost per ton of scrap removed excessive.

Fig. 1

General view of Cruiser "Brooklyn," September 26, 1922, at Union Construction Company's Yard, Oakland, Cal.

Comparative Cost Data

The following tabulations give in detail the results of a comparative test made to determine the cost of city gas and acetylene in cutting operations. The different tests were made by the same operator cutting continuously for fifteen minutes in each case and the character of material cut was the same for both gases.

Cost of city gas per 1000 cubic feet	$0.75
Cost of Oxygen per 100 cubic feet	1.05
Cost of Acetylene per 100 cubic feet	2.75
Cost of labor per hour	0.60

For the purpose of comparison, the total costs of gas, oxygen and labor are shown for cutting 100 lineal inches, as this gives a definite unit on which to base a comparison.

	City Gas		Acetylene Gas	
Test number	1	2	1	2
Thickness of material in inches	6	1 1-16	6	1 1-16
Pressure of Oxygen in lbs.	85	40	110	40
Pressure of Gas in lbs.	21	25	15	15
Cu. ft. Oxygen used	128	48	100	36
Cu. ft. Gas used	7.7	3.3	7.0	7.0
Cost of Oxygen	$1.344	$0.504	$1.05	$0.378
Cost of Gas	0.006	0.003	0.193	0.193
Cost of Labor	0.15	0.15	0.15	0.15
Cost for 15 minutes	$1.50	$0.66	$1.39	$0.72
Lineal inches cut	27 3-4	59 1-2	19	37 1-2
Cost per 100 lineal in.	$5.40	$1.10	$7.33	$1.92

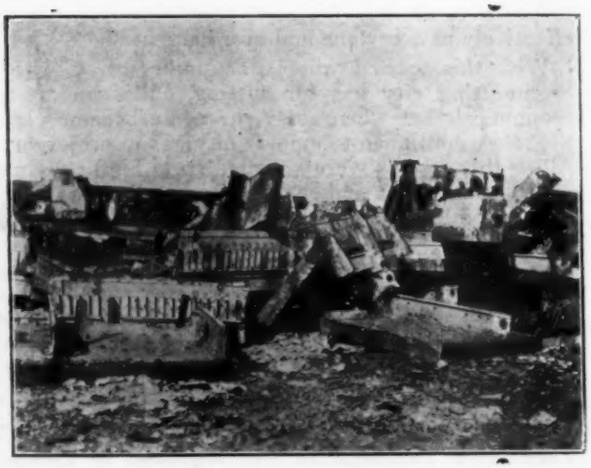

Fig. 2

Pieces of armor as removed from ship before being cut for shipment to foundry. Cruiser "Brooklyn."

This shows a net saving of $1.93 for each 100 inches of 6 in. plate cut, and $0.82 for each 100 inches of 1 1-16 in. plate cut. It does not require much of a mathematician to see why this shipyard uses gas.

These tests were made under ordinary working conditions on board the "Brooklyn." The 6 in. plate was protective decking made up of three plates riveted together; the top plate was 3 in. and the other two 1½ in. each. The lighter cuts were made on decking made up of two plates riveted together; one plate being ½ in. and the other 9-16 of an inch in thickness. Between the plates were varying thicknesses of red lead and rust.

City Gas for Cutting New Clean Steel

The foregoing has dealt largely with the use of gas for cutting old material covered with rust, but the same results can be obtained in cutting new clean steel. The following tests were made on a basis of a continuous fifteen minute cut without stop. It was found that the average cutting speed with all gases was 100 lineal ft. per hour for the lighter section, and 60 lineal feet per hour for the heavier. Costs are based on the following prices:

City Gas	$1.00 per 1,000 cu. ft.
Hydrogen	.90 per 100 cu. ft.
Acetylene	2.75 per 100 cu. ft.
Oxygen	1.40 per 100 cu. ft.

Fig. 3

Beginning cutting through three plate laminated 6 in. protective decking. Red lead and rust between plates. No. 5 Victor city gas cutting torch used. Oxygen pressure, 90 lbs. City gas pressure, 25 lbs. Speed of cutting, 42 lineal inches in 30 minutes. Cruiser "Brooklyn."

Size Tip	Thickness Material	Pressure Oxy.	Pressure Gas	Consumption Oxy.	Consumption Gas.	Cost Oxy.	Cost Gas	Total Cost
				CITY GAS				
1	⅜	40	25	31	8⅛	$0.434	$0.008	$0.442
3	1¼	40	25	46	13¾	0.644	0.014	0.658
				HYDROGEN				
1	⅜	40	10	30½	14	0.427	0.126	0.553
3	1¼	40	12	46½	19½	0.671	0.176	0.847
				ACETYLENE				
1	⅜	40	9	30½	5¼	0.427	0.144	0.571
3	1¼	40	9	45	6½	0.630	0.179	0.809

Fig. 4

Showing Acetylene being used in cutting plate the same as in Fig. 3. Oxygen pressure, 120 lbs. Note excessive slagging at bottom plate. Cruiser "Brooklyn."

Discussion of Results

Each cost, as shown above, is the average of a number of similar tests so made that they can be considered as applying to work under average conditions. It will be observed that the total cost of cutting with city gas is approximately 20 per cent less than with hydrogen or acetylene and the saving therefore would be decidedly worth while for any plant doing considerable cutting. Railroad yards, steel foundries, and structural steel shops particularly, would fall into this classification.

Cost Figures Favor Gas

It has been found that a plant using 25 cylinders of acetylene or 5,500 cu. ft. per month, at a cost of

(Continued on page 541)

*Public Relations and the Executive

How he can carry on his public relations work

Frank R. Coats

President Toledo Edison Co.

Many articles and papers have been written on the subject of Public Relations from all standpoints. The subject has been attacked from the viewpoint of the employees of the gas company, of the public, and the Public Service Commission. The following paper treats this matter from the standpoint of the executive. It describes what his relation is to this very important phase of the gas company's business.

PUBLIC relations is a phase of our business which has been emphasized during the past few years. The wonder is that so few operators and managers appreciated its importance in the earlier days of our industry's activities. Are we all cognizant of its benefits today? Are we all "up on our toes," forwarding this movement at the present time? Let each and every man and woman connected with the public utility ask himself or herself these questions and if an honest answer is given and advantage taken of the conclusions thus arrived at, then, and only then, will our friendly and improved relations with the public approach the one hundred per cent mark.

Those who are firm believers in the building up of friendly relations with the public can spread this gospel among their associates by word of mouth and writing, but in numerous instances it will fall on non-responsive ground. It is with the hope that all in our industry will carefully consider these thoughts that these remarks are given to you in the form of a paper.

The first person to be sold on this subject is the chief executive of the property. He can make or break the resultant good.

Four Methods of Carrying Out Public Relations Work

There are four methods for the executive to carry on his Public Relations work:

1.—Know your service.
2—Know your employees.
3—Know your public.
4—Know your press.

Service Work

First—The executive who would be successful must know his service. This will not come to him entirely from reports of his subordinates, but to know it thoroughly he must be familiar from a personal contact standpoint; he must listen to suggestions and make it his duty to see that the public is getting service that is everything the word implies.

The people are paying for service and it is our duty to see that they receive that for which they pay. Always be alert to improve conditions when possible. There are so many times when a condition arises which can readily be taken care of, and, if properly handled, makes a stronger friend for the company.

The use of horse sense and good judgment go hand in hand with service. Do not lean backwards in carrying out your rules and regulations, but be broad gauged enough to bend a little if necessity should so demand. The cashier's window, the desk of the complaint department, the general manager's and chief executive's offices are all places where "you can win an argument but perhaps lose a customer."

In fact, every representative of the public utility who comes in contact with the public can aid in giving service by living up to the rule of "treating all as you would desire to be treated." Always remember that the word "service" has a broad meaning, and do not hesitate to see that it is rendered in every way that its meaning implies.

Public Relations and Employees.

Second—Sitting behind your desk in the office will never secure for you the hearty co-operation of your employees. Visit the men and women in your employ at their work. Get acquainted with them; be familiar with their problems from personal contact. Do not hesitate to give encouragement where encouragement is due. A slap on the back at the work bench with sincere words of praise will aid in making a more loyal employee. After you have secured the confidence of the employee you will find him more readily disseminating your views than by talks or bulletins, when you are not personally acquainted with him. At the proper time secure the employee as a stockholder in the company. It is to his interest, as well as the company's, that they both should be partners. Let the manager have group meetings with the employees held from time to time, at which the company's problems can be thoroughly discussed. Also at these meetings have any problem of interest taken up and thoroughly gone into, so that the employee may obtain from the proper source the correct viewpoint relative to any subject, rather than securing same from soap box orators or others of a similar ilk.

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*Abridged from an address delivered before the Great Lake Division of the National Electric Light Association at French Lick Springs, Indiana, September 25.)

The thought it is desired to emphasize is that in order to secure the greatest co-operation from the employees, both the employer and employee must personally be acquainted, and that no employer or officer should be too busy to take sufficient time from his desk each week to thoroughly cement the relationship between the company and its employees.

Public Relations and the Public

Third—In order to become better acquainted with your public, adhere strictly to the policy of a square deal for all.

A few basic rules given herewith will prove beneficial, if followed:

A kind word directly spoken will make friends.

In public utility service one should take the public into his confidence, laying all the cards on the table, face up.

Every person is human and likely to err; be patient in your dealings with every one.

A corporation's office should be devoid of red tape; the company's representative should always keep his door open to the public.

Make no promises that cannot be kept.

Be careful when talking on the telephone; the tone of your voice can easily be misunderstood.

Executive Should Be in Close Touch With Public

The executive should be in close touch with his public. He should be a leader in his community and take an active interest in all civic affairs. The greater the interest the officers and employees of the utility take in the constructive doings of their communities, the more strongly will the company be held in the esteem of the public.

The executive and other representatives should take an active part in civic meetings, as there is always an opportunity to present the company's position. Through other avenues, the school children, luncheon clubs, women's clubs, church clubs, workers in the shops can be reached and our problems placed squarely before them. The public is hostile and antagonistic either through misinformation or through some fault of the company serving it. If the former, it can be set right by a straightforward presentation of the utility's position. If an error has been made by the company, correct it at once and acknowledge the fault. Securing the public as partners through the channels of Customer Ownership is very helpful to both the company and the community.

Public Relations and the Press

Fourth—The straight publicity end of Public Relations work is without question one of its most important phases. Great strides have been made in molding public opinion in this country through a judicious use of bona fide news in the editorial columns of the American press. We have probably the most human public in the world to handle, and it is also probably as keen in its analyses as any other public. Because of this, molding public opinion with news should be done with the greatest of care. The preparation of the copy itself should receive the attention of experts, preferably of men who have been more than moderately successful in the newspaper field.

The reason for this is obvious. A real newspaper man knows news as a surgeon knows anatomy. He is an instinctive expert because of his training, and the organization aiming at the dissemination of educational material which will serve to mold public opinion should be equipped with such an expert, and depend upon him to decide what is and what is not news.

In educational publicity the secret of success lies in telling the story as simply as is humanly possible. Fundamentals should be explained in the language of the man in the street, but special campaigns need not be carried on simply to get them over with the public. The real difficulty is found in keeping executives sold on this kind of work, which is largely good will provoking in its beginning, and from which actual business seldom results for a long time. Too much publicity on any subject, even though the copy may be legitimate news, will kill the purpose of the campaign deader than poor copy.

Women Employees Can Do Much Good

No more good can be accomplished than through our women employees who can carry the company's story to the various organizations with which they are connected.

Education of the public should begin in the common schools and not in the colleges. Not only should our story be told to the children, but they should be given training that will combat any radical teaching that might be given them. This plan should then be extended until the higher institutions of learning are reached, where thorough public utility courses should be made a part of the curriculum. This form of teaching is in its infancy at present, but it is gradually getting a foothold in our universities and colleges.

If the minds of the younger generation can be given the proper training respecting our problems it will not be necessary in the future to undo impressions and thoughts which have become deep seated either through ignorance or as the result of misinformation from unreliable and distorted sources.

Better Understanding With Public, Prime Purpose of Work

Underlying all these activities is the one prime purpose, namely, to create a better understanding be-

(Continued on page 536)

*Deposits In Gas Pipes and Meters

Gas oil and gum deposits – Light oil composition— Revivification in purifier box

Ralph L. Brown, Chairman *

U. S. Bureau of Mines, Pittsburgh, Pa.

The following paper represents the report of the Committee on Deposits in Gas Pipes and Meters, read at the Thursday Session of the Technical Section of the American Gas Association assembled in Convention in Atlantic City.

Introduction

THE report of the Deposits Committee for 1922 dealt exclusively with the study it had made of gummy and resinous deposits in pipes and meters. It reported that the gummy deposits were due fundamentally to the unsaturated hydrocarbons of the gas. It reported the identification and the measurement of the particular chemical compounds that are gum-forming and which are responsible for gum formation in pipes and meters. It reported, in simple terms, the chemical properties and behavior of the principal compounds—indene and styrane. It proved that the gummy deposits were largely formed from these compounds through polymerization, autoxidation and other chemical action. It pointed out the incontestable evidence proving that the oxygen of the gas plays an important role in gum formation. In addition, the role is an inevitable one, general and second only to the presence of the natural condensate with which it may react. The committee reported many other lesser factors in gum formation, some being by-products and corrosion deposits acting indirectly, others primary constituents of the gas such as H_2S or SO_2, etc. The latter are specific and not general because a number of plants in which entire normalcy of operation was maintained have experienced gummy deposits in various degrees of severity. Naturally, where gas practically unpurified passed for an extended period into the distributing system in which all the factors mentioned above were operating at a maximum, sulfur in its various forms functioned heavily as stated in the report of this committee for 1921.

The formation of gummy deposits by any gas is dependent primarily on the quantity and composition of the light oil it carries. This latter has its pyrogenetic origin in the gas oil used and in the chemical and physical changes effected in it in the carburetting process. Control of the quantity and composition of the light oil, carried by the gas into distributing systems, is vested in three gross major factors. These are, first, the oil used in carburetting the blue gas, second, the process of carburetting, and lastly, the purification processes. These latter included the cooling, condensing, the removal of tar and other impurities of the gas. A fourth general factor entering into gum formation is the oxygen content of the gas and the control of this is obviously to be found in the operation of the purifiers. A general discussion of these major factors appeared in the May issue of the A. G. A. Monthly and they need not be taken up again here.

*Assistant Chemist, U. S. Bureau of Mines.

Work in 1923

The program of work of the Deposits Committee for this year—1923—was based on the four major factors just mentioned. Material ready for presentation will be presented under the following titles:

I. Oil.—The relation of the character of the gas oil to the composition and gum-forming constituents of the light oil of the resultant gas.

II. Carburetion.—Light oil composition as found in carburetted water gas.

III. Purification.—A report on the actual oxygen consumption by purifier boxes, where revivification in situ is employed.

I. Gas Oil

The relation of the character of the gas oil to the character of the light oil and to the amount of gum-forming constituents in the gas has been investigated by Mr. E. F. Pohlman, the writer, and Mr. H. G. Berger* through the courtesy of the Peoples Gas Light and Coke Company of Chicago, and the U. S. Bureau of Mines.

The plan of investigation was to crack samples of different types of gas oil under strictly comparable conditions and to determine the quantity and composition of the light oil in the resulting gas. The entire experimental detail of the investigation cannot be included in this brief report and will be published separately. For the present purpose, it will suffice to say that three gas oils in common use—two grades of Mid-Continent, and a California oil—were cracked in an atmosphere of blue gas in the apparatus developed by Pohlman and his associates some years ago and used generally since. The apparatus was fitted with condensing coils maintained at -20° C. and a wash oil scrubber of the

usual design for the recovery of the light oil. The recovery was quite complete since about 50 per cent of the light oil was recovered as condensate and the remainder caused an enrichment of the wash oil of only about 1.5 to 2.3 per cent. The apparatus, cracking procedure, light oil recovery, methods and technique of light oil examination remained the same throughout the investigation. The only two variables were the oils tested and the cracking temperature. The control of the latter was based on four thermocouples and the averages for a run was within ∓3° F. of the temperature indicated. The rate of oil input was kept constant at 12.5 cc. per cu. ft. of blue gas which is equivalent to 3.3 gallons per M of blue gas or 2.75 gallons per M of finished gas.

The properties of the oils used in the tests and the results obtained are presented in the tables which follow:

tion of much greater value than that just given. Your attention is directed to the variation in values throughout the table with the changes in temperature. This is shown very clearly in the case of the first gas oil where the cracking was carried out at four temperatures whose extremes approximate practical working limits. As is to be expected, the light oil diminishes (and the oil gas volume increases) with rise of cracking temperature above 1350° F. (Col. I and II.)

Under Column IV, it is to be noted that, in the case of the two Mid-Continent oils, there is a shift to the left in the percentages with increase of temperature. This means within the usual cracking range that, with increase of temperature, the light oil contains more benzene and toluene and less of the higher boiling hydrocarbons which condense and constitute the greater part of the drip oil and meter condensate. That the same general variation occurs

TABLE 1

Oil	Sp. Gr.	Be Viscosity at 60° F.	Fractionation 0-300	300-400	400-500	500-600	600-700	700-750	Residue	Description tion.
Mid-Continent No. 1	.8419	36.3	11.04	—	—	70%	23-4	2.3	3.3	0.3	Light yellow
Mid-Continent No. 2	.8934	26.7	1.2	—	—	4.4	17.1	22.6	49.5	3.7	Thin dark oil
California	.9365	19.5	53.4	.4	.3	2.9	16.6	41.5	25.0	10.1	Black viscous topped crude

Discussion

In Table 1 will be found the characteristics of the gas oils under self-explanatory headings. The results of the investigations are given in summary in Table 2. The column headings in this case are full and self-explanatory. By a comparison of the data, which are given in lines 2, 3, 5, 6, 7 and 8, it will be seen from Column II that for different gas oils, the resultant light oils vary in amount, in composition (Column IV), in total unsaturation (Column V), in the degree of unsaturation of the principal gum-forming fractions (Columns VI and VII), and finally in the relative magnitudes of the indene fractions (Volumn IX) and in the indene contents of those fractions based on a unit volume of gas oil cracked (X).

The table need not be analyzed further at this time, for from the present point of view the amount of gum-forming constituents per unit volume of gas oil, the Mid-Continent oil No. 2 may be said to have given the greatest amount, the California oil next and the Mid-Continent oil No. 1 lowest of gum-forming material when cracked under the conditions indicated.

Operation

However, the data of Table 2 furnishes information of much greater value than that just given. Your attention is directed to the variation in values throughout the table with the changes in temperature. This is shown very clearly in the case of the first gas oil where the cracking was carried out at four temperatures whose extremes approximate practical working limits. As is to be expected, the light oil diminishes (and the oil gas volume increases) with rise of cracking temperature above 1350° F. (Col. I and II.)

Under Column IV, it is to be noted that, in the case of the two Mid-Continent oils, there is a shift to the left in the percentages with increase of temperature. This means within the usual cracking range that, with increase of temperature, the light oil contains more benzene and toluene and less of the higher boiling hydrocarbons which condense and constitute the greater part of the drip oil and meter condensate. That the same general variation occurs in the unsaturated hydrocarbons is evident from Columns V, VI, and VII. The most significant figures, however, are those of the three last columns. In going from a cracking temperature of 1350° to 1400° F., the total unsaturation figures for the light oil from unit volumes of the Mid-Continent oil change from 90.5 to 61.0 and from 98.7 to 62.7. For the California oil, the change is from 90.3 to 75.2. In a like manner, the relative volumes of the indene fraction (b. 160-200° C.) changes from 56.3 to 35.4, 58.9 to 39.0 and 42.4 to 35.7, respectively. Finally, the actual indene measure changes under the same conditions in the following ratios, 32.2 to 23.8, 41.9 to 28.9, and 36.5 to 30.8.

With these facts and figures before you, it is desirable to quote from the paper of the writer in the May A. G. A. Monthly relative to the plants studied during the survey of 1922. "In eleven generating plants, supplying carburetted water gas to systems in which no gum trouble was occurring, the average of the pyrometer readings or reported values for carbureter (bottom) temperatures was 1374° F. For seven systems in which there was distinct trouble, this average value was 1329° F. In the first set of eleven cases, one plant was employing a temperature below 1350° F. (The rate of oil input was relatively low.) In the second set of seven, one plant showed a value above 1350° F. It can now be no

(Continued on page 536)

The Importance of a Maintenance Department

R. E. Pierce

One of the most important factors in the automobile industry today is Service. The dealer's responsibility does not end when the sale is closed. The customer rightfully expects service on his car and the successful dealer will not hesitate to give the best service possible because he realizes that good service means good sales. Automobile dealers have organized service stations all through the country and these stations are under the supervision of trained men who are on the job twenty-four hours a day and seven days a week, looking after their customers and giving them advice and good service.

Importance of Maintenance Department in Gas Company

A service or maintenance department is just as important to the gas industry as it is to the automobile industry. A gas company may have one of the best water heaters on the market, but if the customer is unable to get satisfactory results after purchasing one of these heaters he will soon get the wrong impression of the heater and will become a knocker rather than a booster. The customer is not to blame because he is unable to adjust or fix his gas appliances. The chances are he has never been properly instructed by a representative of the gas company who thoroughly understands the entire gas equipment in the home or factory.

It is universally conceded that the Sales Department is one of the most important departments in a gas company, but is it not much more important to keep the business already obtained than to invest large sums to obtain new business? Increase in consumption on a meter already in use is just as much to the benefit to the gas company as a new customer.

Division of Work of Department.

The work of an up-to-date maintenance department should be first of all to make a systematic canvass of the territory served in order to regulate gas lights, clean and regulate burners on gas ranges and water heaters, to make suggestions for new equipment and to perform any other duties that will improve the relations between the company and the consumer.

The men employed in a maintenance department should be very carefully selected because the people will judge the company's business methods by the way these men conduct themselves while in the homes. The maintenance man should have a thorough knowledge of all gas appliances. He must be polite and courteous at all times. He must possess a pleasing personality in order to leave a favorable impression with the customer. These men will have many excellent opportunities to make sales; therefore, they should have the qualifications of a salesman.

Cost of Department Acts as Deterrent.

Many gas companies do not have a maintenance department because they have the impression that it will be a drag on their finances, but a well organized maintenance department should be without question self supporting, because there would be a profit from increased sales. Then there is to be considered the increased consumption per meter, due to the lights being properly regulated, and the most important asset of all—a satisfied customer.

Benefits to Be Gained from Department.

The summary of the benefits derived from a department of this kind are as follows:

First—Improved relations between customer and company.

Second—Increased consumption per meter installed.

Third—New appliances introduced into the homes.

Fourth—Customers who are dissatisfied because of poorly regulated appliances will be retained and made to be satisfied.

If a gas company intends to retain the gas lighting load and meet the competition of the electric light, it must first of all establish a well organized maintenance department.

PRODUCER GAS PLANT

The plant is of the kind in which air and steam in correct proportions are passed upwards through the retort, forming a combustible gas. The grate is formed of two circular grids which are placed face to face, one of them being recessed so that when assembled, channels are formed through which water may be passed. Such an arrangement constitutes a flash boiler, and is connected to an automatically controlled water supply, the supply being regulated by a diaphragm pump. (Patented in British Patent No. 201,664).

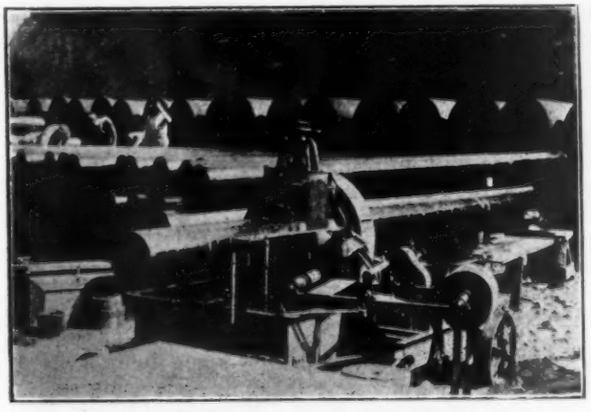
Portable Pipe Wrapping Machine for Gas Pipes

New device used by Pacific Gas and Electric Company

Charles W. Geiger

Numerous methods of protecting wrought iron and steel pipes have been devised and used from time to time in the attempt to prolong the life of the underground structure; most of these have been effective under some conditions, but fail under others. All manner of paints have been employed. Some need heat for application and others can be applied cold. Paint, however, when used alone, is very susceptible to mechanical damage, as, for example, from falling rocks or blows from shovels, and the protective coating may be injured even before the pipe is covered.

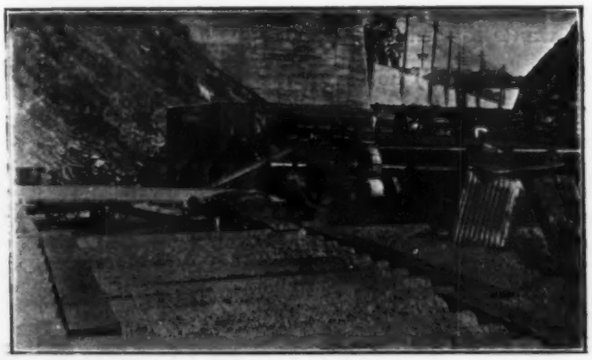
Several methods of using a fabric covering in conjunction with a heavy paint, usually of the asphalt type, appear to have been effective under many different conditions, but generally great difficulty is experienced in the application, as it is necessary to complete the covering job before the asphalt paint sets or dries. As most asphalt paints are hard at ordinary temperatures, it can well be realized how fast the work must be carried out to insure good results.



Wrapping Machine. At the right can be seen the roll of felt covering used. At left in foreground is the vat for heating the asphalt.

Machine for Covering Pipe

Some of the companies manufacturing light-weight riveted steel water pipe have developed a lathe-type machine for covering thin pipe which has proven to be very satisfactory when an asphalt-treated felt paper and, as a binder or paint, an asphalt, solid at above 250 degrees F., are used. The asphalt works well at 350 degrees F. to 375 degrees F. This type of machine is so large as to make it imperative that the work of wrapping or covering be carried on in a shop, and this, of course, entails the shipping of the pipe from the factory to the station nearest the job and hauling from there to the places where the pipe is to be laid. In the case of light-weight pipe, the shipping and hauling is not injurious if reasonable care is exercised, but with the heavier pipe, such as is used for gas distribution and for water mains, such extra handling is almost sure to result in serious damage.



In the foreground can be seen the pipes that have been covered. Note the sawdust and fine shavings on the pipes. At the right is the machine and in the background can be seen the stack of pipes that are to be wrapped.

Portable Pipe Wrapping Machine

The need for a device of a type to make practicable the wrapping of the pipe in the field has been felt for a long time, but it was not until some months ago, during the construction of a six-inch gas main in Marin County (just across the bay from San Francisco) by the Pacific Gas & Electric Company, that

(Continued on page 541)

Can Gas Pictures Tell the Story?

Public libraries supply schools with pictures of interesting industries

Frank H. Madison

Are pictures connected with the gas industry interesting enough to fit into the growing plan of educating public school pupils about industries through picture collections loaned by the public libraries?

Miss Viola M. Bough, children's librarian at the Hamilton Park branch library in Chicago, and a specialist in the work of editing picture collections for the schools, thinks such educational work could be done. Perhaps the gas company may not have as many interesting pictures as some other industries, but surely there is something the child wants to know about that substance which supplies heat and light to the home and fuel to many industries. What is the story behind the gas meter? Could it be told in pictures?

In other industries pictures from every available source are secured. These are mounted on attractive green art mats, which are loaned to the pupils upon their regular library cards. The pictures are studies in connection with the regular school work. They are also taken home and it is inevitable that facts about the gas company, told in this manner, should come to the attention of the grown-ups in the family, because the youngster, who learns something new, wants to air his knowledge in the family circle.

Actual Photographs Preferable.

Actual photographs are preferable because of their durability and clearness. But general magazines, scientific publications and even trade journals and advertising literature are searched for pictures that can be used in these collections. Some of the most interesting views in the Hamilton Park collection are from trade periodicals and advertising booklets because they depict processes and products not often found in the general publications. An interesting set about a certain food industry was made up through securing a copy of a booklet, printed by the rotagravure process upon durable glossy paper and showing the source of the materials and the journey they went through, including the factory, before they reached the consumer. The only requirement is strong paper. Otherwise the pictures would soon be spoiled by constant handling. And each art mat costs the library six cents, in quantities, to say nothing of the time of the editor.

Use of the Pictures

Where do these pictures go?

Take, for example, the Hamilton Park branch library in Chicago. It lends picture collections to fifteen large schools in the surrounding territory. These schools have a total enrollment of somewhere between twelve and fifteen thousand pupils. In addition, the picture collections are often lent to students at the big Normal School a few blocks away—for study by the young women who are soon to become teachers in the public schools.

This is only one of the many branch libraries in Chicago. But Chicago is not the only city of interest to gas men. Miss Bernadine McLaughlin, librarian at Hamilton Park, and Miss Alberta McDermott, librarian of the Blackstone Branch, in another part of the city, gave more information about the scope of the work; it is a growing part of library work all over the country. It was pointed out that Newark, N. J., and other libraries had interesting industrial collections.

Nature of Pictures

But what sort of pictures could be supplied?

Sometimes a picture of a plant is found absorbing to the public—and the children constitute a young public—the public of tomorrow. The Peoples Gas Company has found that there was great interest shown in the model of some of its works which was shown at different expositions. It is now on display in the main floor of its building. It uses the picture frequently.

Perhaps the working of a meter would satisfy the curiosity of many children. What an excellent thing it would be to have a friend in the family who refutes the idea that the gas company has a crooked mechanical device to cheat the unwary. What kind of machinery is used in digging trenches for mains? How about pictures of different products that are being turned out where gas is used for fuel in industries? Can some of the materials used be traced back to their sources—coke, oil, pipe? Let a child learn at the impressionable and retentive age that the gas company has to pay out some of its money for tangible materials and when grown up it will bear good will toward the public utility.

These are only primary suggestions, but they indicate the range of subjects which have interested children in other industries. If they want to go clear back to the raw materials in food and clothing study, why not in gas?

Of course such a plan as this, if co-operated in by the gas company, is not an out-and-out advertising proposition. But suppose a gas company finds that the local library or the schools—some schools are making their own picture collections—are using such methods of visual education. Why wouldn't it be possible to supply a set of pictures, either photos or half-tones, to the library or schools? Then to make a duplicate set for use in window displays with an accompanying card to explain that these pictures were being studied in the schools because the gas company was one of the most important factors in the life of the community?

But, as Miss Bough pointed out, the children will not accept just anything—the pictures must tell them something they want to know or, in short, be interesting.

Are such gas pictures possible?

As The Journal Views It

AN INDUSTRIAL GAS RATE

The Committee on Rate Structure, in its last report, presented before the Fifth Annual Convention of the American Gas Association just ended, made an opening statement which demands the careful attention and consideration of every gas company and every gas man in the country. It is, in fact, an implied, thorough, veritable arraignment of the American Gas Industry before the bar of progress.

According to this report, twenty years have elapsed since gas men first began to talk about equitable, scientifically and logically constructed gas rates. The obstacle to gas progress of an arbitrary, unscientific, impractical and uneconomical rate structure has resisted whatever efforts the gas industry has made to remove it during this period.

Shall this be called progress? Is this the most that gas men can do to place their industry in the position that it should and must occupy as the premier enterprise of the land, supplying both industry and the home with that most essential of all commodities, fuel? Can the gas industry risk comparison with other American industries in its record toward real progress? A goal is not lacking. The top of the ladder of progress is clearly defined. It is there for all to behold.

Gas must be the universal fuel; there can be no middle course. The industry must strive for the most. Gas possesses all the requisite characteristics of a fuel which can be used for every purpose where heat is required, and still some seem to be blind to facts. We cannot see what the future holds for the gas industry if it will grasp the opportunity that is knocking at its door, and has in fact been knocking for a considerable time, and it is not at all certain how long it will continue doing so.

The obstacle to gas progress has always been the gas rate. Twenty years have slipped by while gas men talked. There is no longer time for talk. Action must be taken. The very last year of the period just terminated was in fact more replete with action than all the other nineteen years put together. The Colorado decision, a momentous step in gas progress, potent with the greatest significance to the entire gas industry—a real, progressive, constructive move toward the goal. The establishments of industrial gas rates in Chicago and in Baltimore are comparatively recent developments. Only a few other landmarks, such as Denver and Toledo, are conspicuous because of their paucity through the many years of talk and discussion.

The whole problem narrows itself down to just this. The information is available. The technical knowledge and experience are procurable. The spirit of experiment and research, the willingness of capital to make expenditures to develop appliances and industrial technology are prevalent. Only the gas man seems not to be ready. He has not made the proper advances, taken the proper steps to remove the disability, the obstacle, the canker in the gas body, which not only is retarding its growth and natural development, but which actually tends to infect the entire gas enterprise with the insidious germ of desuetude, the spirit of laissez faire, to let things go as they are.

This evil is the gas rate. To get industrial business the gas rate must be such that gas is permitted to compete with other industrial fuels. It cannot sell itself otherwise. A beginning has been made. It is up to the gas companies to make the most of this opportunity. In every State of the Union representations should be made to the proper bodies for industrial rates. The entire gas industry must put up a solid front in its attack on this problem. It is the unequivocal duty of every member of the gas fraternity to assist in this undertaking.

This much must be evident. The gas industry must go forward. Letting things remain as they are simply means retrogression. There is no such thing as standing still. Either the next few years will see a phenomenal advance in the gas business, in the use of gas for all industrial and domestic purposes, or it will spell defeat, the loss of business which rightly

belongs to gas, the supplanting of gas by other fuels.

Shall the American Gas Industry go on, carry on and attain its goal? We say, by all means, yes! It is up to the gas companies and the gas men. Let's go.

PUBLIC RELATIONS AND THE EXECUTIVE

(Continued from page 529)

tween ourselves and the public, both in our own self-interest and because it is the public's rightful due that it be accorded such information regarding our industry, its fundamentals and its problems, as will enable it to judge both intelligently and fairly when any legislative or municipal action is necessary relative to our industry.

Fellow associates, we have a work to perform. Shall we who intimately know the facts regarding our industry impart this information to the public, or shall we allow those who are openly or covertly hostile to our interests to misrepresent or deliberately lie about our enterprises? There is only one answer. We must and will do our part. If we do not act, others will.

DEPOSITS IN PIPES AND METERS

(Continued from page 531)

longer doubted that the character of the gas oil bears a direct relationship to the amount of gum-forming constituents in the resultant gas. It is further evident the cracking temperature is a very important factor in the quantity of gum-forming constituents in carburetted water gas.

Main Factors Interdependent

In the carburetting operation, the major factors are greatly interdependent as discussed in previous reports. The most tangible points of control over the composition of the light oil in the gas are temperature and contact. The latter includes the time element which can be made to vary with the rate of oil input as well as with the quantity factor variable with the number and spacing of the checker brick. It has long been established that in cracking, contact time and surface may be varied reciprocally with temperature. This means that high rates of oil input and wide checker brick spacing are equivalent to a reduction of the cracking temperature which must result, as has just been shown, in a serious increase in gum-forming constituents in the gas. In last year's report, attention was directed to the paralleling of high rates of oil input with a gummy condition of the meters. It is evident that the operation of the carburetting units is of extreme importance in the production or non-production of gum-

TABLE 2

I	II	III	IV				V	VI	VII	VIII	IX	X
			Fractionation in percentage (by volume) of light oil									
Temp. of furnace degrees F.	Light oil in percent of gas oil	Specific gravity light oil below 200° C.	75-100° A	100-120 B	120-140 C	140-160 D	160-200 E	Total unsaturation (to Bromine) in per cent oil light oil	Unsaturation in fraction D (mainly styrene) in per cent of total light oil	Unsaturation in fraction E (mainly indene) in per cent of total light oil	Total unsaturation X 100 in per cent of gas oil	Indene fraction (160-200° C.) in per cent of gas oil X 100	Unsaturation of indene fraction E (160-200° C.) in per cent of gas oil X 100
Mid-Continent Oil No. 1												
1300	6.3	.887	35.4	26.4	13.5	12.4	12.1	18.5+	5.31	8.41	117.1	76.6	52.9
1350	6.7	.878	47.2	27.4	6.5	10.6	8.4	13.5	4.26	4.86	90.5	56.3	32.2
1400	6.1	.885	62.4	19.7	5.6	6.4	5.8	10.0	3.12	3.93	61.0	35.4	23.8
1450	4.86	.885	62.4	19.0	6.3	7.1	5.2	11.1	4.10	4.0	53.9	25.3	19.4
Mid-Continent Oil No. 2												
1350	6.1	.883	44.7	24.5	9.6	11.7	9.6	16.07	5.19	6.83	98.7	58.9	41.9
1400	4.5	.886	46.15	27.9	7.7	9.6	8.65	13.93	4.82	6.41	62.7	39.0	28.9
California Oil												
1350	5.6	.888	45.75	26.6	9.55	10.55	7.55	16.1	6.08	6.50	90.3	42.4	36.5
1400	4.67	.888	43.5	28.8	9.4	10.59	7.65	16.1	5.64	6.59	75.2	35.7	30.8

forming constituents in carburetted water gas.

Careful Operation Important

The importance of careful and correct operation of those units can hardly be over-emphasized when it is considered that, while it constitutes only about 20 per cent by volume, the oil gas contributes well over half of the heating value of carburetted water gas. Development in these units and their operation might well be receiving a larger and more proportionate share of the research energy and attention of the industry.

II. Carburetion: Light Oil Composition

It was the original plan to present information on the amount and character of the light oil in carburetted water gas being distributed under the present thermal standards, and taken from systems which experienced varying amounts of difficulty due to the deposition of gum. The results for one plant can be presented at this time.

This plant distributes nearly two million cubic feet per day. The oil used is a 32-36° Be gas oil from an Oklahoma field, and the input is 3.12 gallons per M. The light oil content of the gas was found to be .3065 gallons per M cu. ft. The tar per M cu. ft. amounts to 0.353 gallons and the drip oil to 0.131 gallons, practically all of which is collected within a half mile of the plant. The characteristics of the light oil from this plant were as follows:

TABLE 3

	Boiling Ranges, Degrees Centigrade					
	0-100	100-120	120-140	140-160	160-200	Total
Total hydrocarbons in per cent boiling below 200° C.	IV-A 66,8	IV-B 20.8	IV-C 5.5	IV-D 4.7	IV-E 2.3	IX 100%22.6
Unsaturated hydrocarbons in per cent of total L. O. boiling below 200° C.	6.5	2.7	2.0	VI 2.05	VII 0.75	detnd. by add. 17.8 14.0% X 7.4

This plant was selected for study because, in the twelve years of its existence, the meter removal for cause has never exceeded 1¾ per cent per year and no gum trouble in meters or pipes has been experienced. The reason largely lies in correct and efficient operation. The calculated cracking efficiency (on a 70 cu. ft. and 300 B.tu. basis) runs at 105 or better.

Discussion of Table

Attention is directed (Table 3) to the extraordinarily high percentage of the light oil present in the benzene and toluene fractions. Conversely, there is little high boiling material in the gas. As a consequence, there exists a very proper and desirable ratio between the light oil in the gas and the drip oil. For purposes of correlation and comparison, Roman numerals have been placed in the squares of Table 3 to indicate the corresponding figures in Table 2 given earlier. It will be seen that, from the standpoint of the non-production of gum-forming constituents, better cracking results are being obtained in this plant than under the optimum experimental conditions reported in Table 2.

We have dealt, up to this point, with the production of the primary gum-forming constituents of carburetted water gas and their control and have seen that the properties of the oil have a certain influence on the amount of these constituents formed. But we have also seen that operation is a greater factor. This is true because equal or greater variation occurs in amounts of gum-forming constituents through operative measures than through differences in the three oils tested. Operation is a more elastic control measure and less subject to change by reason of changes in economic conditions in the oil industry.

III. Purification: Excess Oxygen

We shall now go to the other general factor in gum formation—the oxygen content. Oxygen is a thoroughly general factor because it is functioning wherever there is a collection of drip oil in rusty pipe, in meters, in regulators, etc. Its presence in the gas is certain where revivification in situ is employed as it is at the present time. In last year's report, it was pointed out that the oxygen content averaged 0.8 per cent or more and that since the calculated theoretical requirements for a gas containing 100 grains of H_2S was less than 0.1 per cent of oxygen, the oxygen being added was theoretically some 8 to 10 times that required. It was thought desirable to determine the practical working consumption of oxygen in purifier boxes. To this end a sub-committee, with Dr. J. F. Wing as chairman, was instituted with its membership drawn from the Purification and Deposits Committees. Dr. Wing's report, in full, follows:

Report of Sub-Committee on the Air Needed for Revivification in Situ in Purification

Tests have been reported from five sources. These tests are not at all conclusive, but will, at least, supply data for study.

They all indicate that, under all the conditions existing at the time of the tests, considerably less admitted air would have served the purpose desired and less surplus oxygen would have passed on.

In examining the results of Plant 1, I note great inconsistency in the oxygen figures, notably in the amounts at the beginning and end of the passage of gas. The large amount of H_2S removed in the first box, 60 per cent, 80 per cent and 98 per cent, indi-

AIR REVIVIFICATION TESTS REPORTED BY PLANT NO. 1

	Inlet Pur. House				*Inlet Box 2*		*Outlet Purifiers*	
Water Gas	H_2S	O_2	Temp.		H_2S	O_2	H_2S	O_2
April 3rd	100	.5%	85°	Set 1	2.	.7%	3.	1.1%
				" 2	2.	.8		
				" 3	2.	1.0		
April 4th	113	.6	85°	Set 1	19.	.9	2.	.8
				" 2	2.	.9		
				" 3	40.	.5		

There are 3 sets of 4 boxes each. One is taken off daily from each set of 4. Revivification in situ in the others.

Not feasible to change the percentage admission of air.

Sulphur in generator coke 8/10%.

Sulphur in gas oil 5/10%.

Oil per M 3.55 gallons.

Oxygen results not consistent.

1.5% air admitted.

AIR REVIVIFICATION TESTS REPORTED BY PLANT NO. 2 ON COAL AND WATER GASES

	Inlet Box 1			*Inlet Box 2*			*Oxygen Loss*	*Inlet Box 3*			*Inlet Box 4*			*Outlet Last Box*			*Air*
COAL GAS	H_2S	O_2	Temp.	H_2S	O_2	Temp.	%	H_2S	O_2	Temp.	H_2S	O_2	Temp.	H_2S	O_2	Temp.	Admitted
Apr. 23, 1923 81 M	280	1.9	82°	80	1.7	92°	.2	—	—	86°	—	—	76°	—	1.8	64°	4%
Apr. 26, 1923 79 M	300	1.3	76°	180	1.2	86°	.1	—	—	86°	—	—	80°	—	1.3	68°	4%
Apr. 27, 1923 138 M	520	1.6	65°	250	1.5	83°	.1	10	—	86°	0	1.5	80°	0	1.5	75°	5%
Apr. 27, 1923 100 M	530	.6	60°	350	.5	80°	.1	20	—	82°	0	—	77°	0	.5	75°	None
WATER GAS																	
Apr. 23, 1923 116 M	260	1.1	98°	180	1.1	94°	0			94°			94°		1.1	92°	4%
Apr. 26, 1923 103 M	270	.6	116°	30	.5	113°	.1			100°			83°		.7		4%
	Sulphur in coal 2%							Sulphur in oil .6%									

O_2 ABSORBED BY PURIFYING RICH COKE OVEN GAS COMPANY NO. 3

Date	*Inlet 1*			*Outlet 1*			*Oxygen Loss*	*Outlet 2*			*Outlet 3*			*Outlet 4*			*Sulphur in Coal*
	H_2S	O_2	T	H_2S	O_2	T		H_2S	O_2	T	H_2S	O_2	T	H_2S	O_2	T	
3/10/23	400	.6	60	300	.3	75	.3	Not tested			Not tested			15	.3	77	1.16%
3/12/23	360	.6	64	260	.4	77	.2	do.			do.			10	.4	81	1.32
3/13/23	330	.7	65	240	.4	80	.3	do.			30	.3	80	Not tested			1.35
3/14/23	330	.7	64	270	.5	77	.2	174	.4	79	86	.3	81	15	.3	82	1.22
3/15/23	360	.7	64	270	.5	80	.2	190	.4	80	60	.4	81	Not tested			1.19

Date	*Inlet 2*			*Outlet 2*			*O Loss*	*Outlet 3*			*Outlet 4*			*Outlet 1*			
	H_2S	O_2	T	H_2S	O_2	T		H_2S	O_2	T	H_2S	O_2	T	H_2S	O_2	T	
3/16/23	360	.6	66	270	.4	79	.2	180	.3	81	70	.3	81		Off		1.19
3/17/23	380	.7	60	240	.5	79		160	.4	79	115	.4	80	10	.4	80	1.13

Date	*Inlet 3*			*Outlet 3*			*O Loss*	*Outlet 4*			*Outlet 1*			*Outlet 2*			
	H_2S	O_2	T	H_2S	O_2	T		H_2S	O_2	T	H_2S	O_2	T	H_2S	O_2	T	
3/27/23	310	.8	65	200	.5		.3	110	.4		40	.4	78		Off		1.22
3/28/23	400	.6	58	290	.5	69	.1	180	.4	74	90	.4	74	30	.3	76	1.26
3/29/23	360	.6	59	260	.4	69	.2	150	.3	71	90	.3	73	20	.3	74	1.39
3/30/23	390	.6	63	300	.5	76	.1	210	.4	76	140	.4	77	30	.3	76	1.12
3/31/23	300	.7	61	230	.5	73	.2	160	.5	75	90	.4	75	30	.4	76	1.23
4/2/23	310	.6	63	240	.4	75	.2	180	.4	76	100	.3	76	40	.3	77	1.18

Date	*Inlet 4*			*Outlet 4*			*O Loss*	*Outlet 1*			*Outlet 2*			*Outlet 3*			
	H_2S	O_2	T.	H_2S	O_2	T		H_2S	O_2	T	H_2S	O_2	T	H_2S	O_2	T	
4/10/23	240	.8	61	190	.6	72	.2	160	.4	74	90	.4	74		Off		.88

O_2 ABSORBED BY PURIFYING RICH COKE OVEN GAS, GAS COMPANY NO. 3

Date		Inlet Box 1 H_2S	O_2	T	Outlet 1 H_2S	O_2	T	Oxygen Loss in %	Outlet 2 H_2S	O_2	T	Oxygen Loss in %	Outlet 3 H_2S	O_2	T	Oxygen Loss in %	Outlet 4 H_2S	O_2	T	Oxygen Loss in %	Remarks
May 25	A	350	1.0	71	250	4	76	0.6	H												Sulphur in coal 1.03. Make per hour about 480 M
	B	300	.4	73	250	.2	79	0.2	150	2	79	—	100	.2	79	0	50	.2	79	0	
May 28	A	240	8	69	176	.4	72	0.4													Air introduced: A tests 1.7%
	B	220	.5	71	160	.2	75	0.3	90	.2	78	—	60	.1	78	1	25	.1	76	0	B tests 1.0%
May 31	A	210	.7	68	150	.4	73	0.3													
	B	290	4	69	190	2	72	0.2	140	.2	73	—	80	2	74	0	30	.2	73	0	
June 1	A	290	.6	71	200	.4	73	0.2													
	B	260	.4	73	190	.3	77	0.1	110	2	77	1	80	2	77	0	40	.2	76	0	
June 4	A	240	8	73	180	.6	78	0.2													
	B	250	.4	79	190	.3	82	0.1	110	.2	83	1	80	2	83	0	20	.1	84	1	
June 8	A	240	.6	70	140	.4	74	0.2													
	B	250	.4	70	190	3	74	0.1	100	.3	76	—	80	4	77		30	.3	77	1	Make per hr. 460 M
June 6	B	260	.7	79	180	.4	84	0.3	110	.4	86	—	70	6	89		20	.5	89	1	Air introduced: A test 1.7% B test none Air meter shut off

There is a 2 to 3 per cent leakage of air into the vacuum.
Oxygen is not measurably absorbed after the first box, and more than is consistent is absorbed in the first box.

AIR REVIVIFICATION TESTS REPORTED BY PLANT NO. 4

	Inlet Box C H_2S	O_2	T	Outlet Box C H_2S	O_2	T	Oxygen Loss	Outlet Box D H_2S	O_2	T	Outlet Box A H_2S	O_2	T	Outlet Box B H_2S	O_2	T	Oxides
COAL GAS																	
1st Test	95	1.0	74°	45	1.0	—	0.0	25	.9	—	20	.9	—	0	.8	—	In C, Sun & Canadian 2nd time, Sulphur 44.1%
	Box B			*B*				*C*			*D*			*A*			
2nd test after Rotation	135	1.2	—	15	1.1	—	0.1	5	.9	—	0	1.1	—	0	1.0	—	In D, Elk & Canadian 4th time Sulphur 45.4 In A, Colegaz & Long 3rd time Sulphur 37.2 In B, Elk & Canadian 1st time Sulphur
WATER GAS	*B*			*B*				*C*			*D*			*A*			
1st test	85	.5	91°	30	.5	—	0.0	5	.5	—	0	.5	—	0	.5	92°	Air admitted 1.% Temp. at air inlet 105
	C			*C*				*D*			*A*			*B*			
2nd test	90	1.0	90°	25	.7	—	0.3	5	.4	—	0	.4	—			94°	Air admitted 1.05% Temp. at air inlet 102
	D			*D*				*A*			*B*						
3rd test	95	.5	90°	50	.4	—	0.1	10	.5	—	0	.5	—			95°	Air admitted 1.0% Temp. at air inlet 108

AIR REVIVIFICATION TESTS REPORTED BY PLANT NO. 5

	Inlet 1st Box H_2S	O_2	T	Outlet 1st Box H_2S	O_2	T	Outlet 2nd Box H_2S	O_2	T	Outlet 3rd Box H_2S	O_2	T	Outlet 4th Box H_2S	O_2	T	Hourly Make
Coal gas:	510	.9	105	283	.9	—	199	.9	—	108	.8	—	0	.9	110	Est. 80,000 cu. ft.
	Air admitted 2.5%						Sulphur in coal 1.04%									
	The boxes hold 6,360 cu. ft. oxide each, all filled with borings oxide for the first time in use.															
	Time oxides had been in service: 1st box 120 days; 2nd box 60 days; 3rd box 210 days; 4th box 205 days.															
Water gas:	230	1.1	140°	85	1.5	—	18	1.5	—	0	1.4	—	0	1.3	120°	
	Air admitted 1.5%						Sulphur in generator fuel .7%									
	Days oxides in service: Box 1—270; Box 2—250; Box 3—180; Box 4—3.															

cates great activity, and the possibility that the analysis may be nearer right than the air meter. The residual H_2S is quantitatively insignificant.

The results of No. 2 show the oxygen absorption to be measurably consistent and indicate the possibility that less air than is usually introduced, is needed. There is effective absorption of H_2S, although the areas of the purifiers are not given.

In the results of No. 3, the oxygen absorption is measurably consistent, but it more than corresponds to the H_2S absorption, and practically all occurs in the first box, where there is the most H_2S.

Under the existing conditions, the 2 per cent air leakage into the vacuum supplies sufficient air for revivification.

The tests reported by Company No. 4 show very little oxygen absorption and indicate that an unnecessary quantity of air was admitted into the boxes.

The tests, reported by Gas Company No. 5, show that, in the case of the coal gas which passes through four boxes, all filled for the first time with new oxide, the oxygen content of the gas is not reduced at all, but that the sulphur is entirely removed by the oxide and that the addition of air seemed unnecessary. In the water gas purification, the oxygen reduction is consistent in the passage through the boxes, but the quantity of air present is unnecessarily large.

J. F. WING, Chairman.

There seems to be little more to be said in summary except that, in the case of water gas, the actual oxygen consumption is approximately 0.1 per cent and in the case of coal gas. with its greater H_2S content, the oxygen consumption is approximately proportionately higher.

On the basis of theoretical demands and of practical operating data at hand, the average present-day oxygen input is unnecessarily large and excessive.

Acknowledgments

The Chairman desires to extend his appreciation, in addition to the acknowledgments already made, to Mr. R. B. Harper of Chicago, to Mr. E. H. Lewis, General Manager of the St. Louis Gas Company, and to Dr. J. F. Wing and his collaborators—Messrs. E. C. Uhlig, A. F. Kunberger, R. L. Fletcher, and C. E. Littell.

Summarizing Statement of Work on Gummy Meter Problem

The report of this committee for 1922 brought out the facts together with evidence:

1922

1. That gummy meter troubles were due to unsaturated hydrocarbons which condense and collect in the pipes and meters; the principal members were identified and their properties described:

2. It was shown that oxygen was a general factor in gum formation and subject only to the presence of unsaturated hydrocarbons; other specific and minor factors were mentioned in some detail;

3. A survey of a considerable number of plants was made and it was pointed out that the presence of gummy deposits paralleled very closely the high rates of oil input;

4. A logical and scientifically correct explanation of this observation was offered. This had to do with incomplete and non-uniform cracking of oil.

The report of the committee of this year, 1923- which has just been read has shown:

1923

1. That gas oils of different properties cracked under the same conditions will give different amounts of gum forming constituents in the resultant oil gas;

2. Of greater importance, was the fact shown by this work that the variation in cracking temperatures exerted a very marked influence on the amount of unsaturated material in the gas and specifically on the amount of gum forming constituents. Confirmatory evidence on the practical side from the survey of last year was likewise presented. It has been shown to follow from these facts that incomplete cracking or non-uniform cracking as evidenced by the presence of gum forming constituents must result from excessive rates of oil input (cracking period) or insufficient contact unless compensated in some other way;

3. The light oil composition has been presented for one plant whose meter condition has been ideal;

4. It has been shown that the average oxygen input in the purifier box is generally excessive.

There remains to close up this work on gummy meter problems:

1. The completion of the survey of the light oil composition in various carburetted water gases;

2. The completion of work on methods of analysis;

3. The vapor pressure of indene is highly desirable;

4. Methods for selective removal of indene and other gum forming constituents at the plant should be considered. Initial indications of work begun are very promising.

USE OF CITY GAS FOR CUTTING STEEL

(Continued from page 527)

$151.25, would use about 11,000 cu. ft. of city gas for doing the same amount of work. This at $1 per thousand would cost $11. However, all of this difference in cost is not saved, as there is a small increase in the amount of oxygen used due to city gas requiring slightly more oxygen than the acetylene. In this instance the oxygen would be increased about 1,500 cu. ft., which at $1.40 per hundred cu. ft. would cost $21. This amount, plus the cost of city gas, would give a total of $32, which indicates a monthly saving of $119.25, to be credited to the use of city gas. By substituting for the above figures and costs actual consumptions of acetylene and costs prevailing in different localities, definite conclusions can be arrived at as to the advisability of changing to city gas. A net saving, such as shown above, would quickly pay for the change in torches and also for the gas piping required in the plant.

Low Pressure Gas Would Have to Be Boosted

If only low pressure gas is available it would be necessary to install a small booster or compressor to pump the gas up to 20 lbs., although a very satisfactory result is being obtained in a steel foundry with gas at 12 pounds. There are on the market a number of small gas pumps suitable for this work. At the present time city gas is being used in a number of shipyards and steel plants in the Bay District, not only for cutting scrap, but also for steel in process of manufacture, and no doubt if more plant managers were familiar with its possibilities its use would be more extensive. Gas companies as a rule cannot afford to spend the time or effort necessary for obtaining a consumer who will use gas only for cutting, because usually the quantity of gas used for cutting is but little more than that used by the ordinary domestic consumer. However, it can be shown that the saving made by using gas for cutting will carry some other industrial application which does not itself show a sufficient saving to warrant the utilization of gas.

Nothing that has been said in this article should be construed to imply that city gas can be used for welding with a torch, and this should be made clear to anyone contemplating the installation of gas. Some success has been experienced with a city gas welding torch in special applications, but it has not yet been developed to a point where it can be used generally.

Summary of Advantages

A brief summary of the advantages of using city gas for cutting will show that:

1—It is more economical than other methods of cutting.

2—The edge of the cut does not have the hard scale or surface found when using acetylene, so if a cut is to be machined, as for example the "gate" on a steel casting, the machine tools stand up better and the machining is done more quickly.

3—There is always a supply of gas on hand. It is not necessary to buy steel containers and the labor and transportation attached to handling is done away with.

4—City gas itself is not explosive. The use of acetylene generators involves a considerable element of danger due to the possibility of explosion with its attendant possible damage to life and property.

5—City gas can be piped to any part of the yard or shop and is always ready for use.

PIPE WRAPPING MACHINE

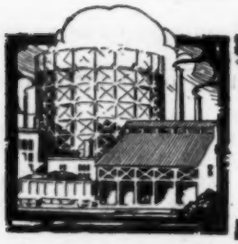
(Continued from page 533)

such a machine was perfected. The machine was used in wrapping all the six-inch pipe laid in the flat part of the route, which was the portion in need of the most protection, as this part of the line lay very near the surface of ground water.

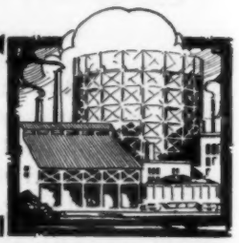
This machine is entirely different from the lathe-type machine, being of center-wheel type, which naturally requires but little room, the lining up necessary being easily obtained by the use of planks or blocks. But few adjustments or changes to the machine are required, even though it was never used before in practical work; 33,458 feet of the six-inch main were wrapped at a point about two miles north of Sausalito and hauled to the ditch side without damage to the covering.

Operation of Machine

The pipe that is to be wrapped is fed into the center of a wheel, which on revolving drives milled wheels which grasp the pipe and rotate. At the same time they push the pipe forward, so that the felt covering, which has been previously impregnated with asphalt, is wrapped spirally around the pipe. Before the felt covering reaches the pipe, however, it goes through a vat of asphalt, heated to approximately 375 degrees F., so that it is coated on both sides with the hot asphalt which it carries to the pipe. The resulting coating is therefore three-ply: first a thick coating of asphalt, next to the pipe, then the fabric, and last another coating of asphalt. The machine does the work at such a rate that the operation is completed well before the asphalt has set and results in a thorough bond without voids. The cost of the protective coating applied to the pipe is surprisingly low, particularly to any one who has had any experience with applying such a material by hand.



NEWS OF THE GAS INDUSTRY



Permitted to Issue Bonds

Rockford, Ill.—Action taken by the Illinois Commerce Commission will enable the Rockford Gas, Light and Coke Company to issue $1,279,000 in bonds as part of a refinancing program.

The corporation received permission to issue and sell $479,000 in first refunding and consolidated mortgage gold bonds, dated March 1, 1909, and maturing March 1, 1959, at 5 per cent; $500,000 in 7 per cent cumulative preferred capital stock, and $300,000 in common stock.

No definite program of changes and improvements of the firm's system has been prepared, Henry S. Whipple, manager, said.

"Part of the funds will be used to pay for changes already made," he said. "Details of the refinancing program are in the air now."

The American Gas Company, Philadelphia, holding company of the local concern, filed the petition to issue bonds several weeks ago. Members of the commerce commission held a hearing on the request and followed later with their decision.

The Rockford Gas, Light and Coke Company originally was capitalized at $300,000. Property value of the concern is approximately $3,000,000, according to a recent appraisal by the commerce commission.

Rates Approved

Gas rates approved by Public Service Commission:

Sea Cliff & Glen Cove Gas Co. Gas service supplied in city of Glen Cove and village of Sea Cliff, N. Y. Rate for gas for light, fuel and power changed from straight line, $2.40 per M. c. f., no minimum charge, to block rates as follows: First 100 c. f., 75c per 100 c. f.; next 300 c. f., 26c per 100 c. f.; next 600 c. f., 21c per 100 c. f.; all over 1,000 c. f. per month, $2 per M. c. f. Minimum charge, 75c per month per meter. Effective October 19, 1923.

The Gas Light Company of Waverly. Gas service supplied in village of Waverly, N. Y. Schedule filed to become effective October 1, 1923, changes rate for gas for all purposes from straight line, $1.95 per M. c. f. to block (per M. c. f.) as follows: First 5,000 c. f., $1.95; next 5,000 c. f., $1.65; excess over 10,000 c. f. per month, $1.55.

Increased Daily Capacity

The Public Service Gas Company is making improvements and extensions to its Market street works in Newark, N. J., and to that end has awarded contract to the U. G. I. Contracting Company, Philadelphia, for the installation of additional carburetted water gas apparatus. The new installation will increase the daily capacity of the plant by at least 3,500,000 cubic feet.

Hearing for Classification of Accounts

A hearing was had before the Public Service Commission at Albany on October 31 on the classifications of accounts for gas and electrical corporations recommended by the National Association of Railway and Utilities Commissioners. It was stated at the hearing that these classifications have already been adopted by a number of the other states and it is the intention of the National Association to continue to recommend its accounting plans until the same have been adopted in all states, thus affording uniformity in gas and electrical accounting throughout the country. A discussion was had as to various features of the proposed classification and also as to certain modifications which might be necessary should the Commission in New York State decide to act favorably upon the general plan.

Permission was given to the parties interested to file further statement with the commission. No decision was made at the hearing.

Electra Will Have New Gas Company

Electra, Texas.—Four local men have just been granted a franchise by the City Commissioners for a new gas company in this city. Work of laying the pipes will start immediately with assurance that gas will be supplied to all homes that want it within ninety days.

The men financing the project are A. T. McDannald, D. T. Cross, W. P. Lincoln and R. Y. Smith. The enterprise will cost about $45,000 and will employ more than forty men in laying the mains.

Public Service Company of Colorado Officials

Clare N. Stannard, vice-president and general manager of the late Denver Gas and Electric Light Company, has been elected first vice-president and general manager of the Public Service Company of Colorado.

Charles A. Semrad, Boulder, Colorado, who was the vice-president and general manager of the Western Light and Power Company, merged with Public Service, is named second vice-president and assistant general manager of the P. S. Henry L. Doherty is the president and is jubilant over the prospects for his latest amalgamation and says that the Public Service Company will be one of the most helpful factors in building up Denver and the cities for miles around.

Will Purchase New Purifiers

North Attleboro, Mass.—The North Attleboro Gas Light Company has started negotiations for the purchase of new purifiers to take the place of the ones destroyed by the recent explosion. A wooden building will be constructed to replace the brick one destroyed.

New Local Manager for Shawnee

Announcement has been made by J. F. Owens, vice-president and general manager of the Oklahoma Gas and Electric Company, that C. B. Owens, manager of the Shawnee Gas and Electric Company, with headquarters in Shawnee, has resigned from this position and that William B. Anthony has been appointed manager at Shawnee to succeed him.

George H. Cressler has resigned as general sales manager of the Stacey Mfg. Co., Cincinnati, Ohio. His resignation was effective November 1.

Queens Gas Co. Business Increases Are Shown

New York, N. Y.—The volume of business of the New York and Queens County Gas Company has increased 30 per cent this year, W. R. Spear, vice-president of the company, testified before Special Master James Graham in the hearing at the New York Chamber of Commerce.

Spear also testified that last year's growth in business amounted to 25 per cent. He said that by the end of November a new generator plant will be installed which will increase the capacity of the company to 3,600,000 cubic feet of gas.

Bond Issue Asked

Montgomery, Ala.—Petition of the Mobile Gas Company for authority to issue certain stocks and bonds, was heard by the Alabama Public Service Commission, and the matter will be taken under advisement as soon as the gas company files some further information which the commission has requested.

The company asks authority to issue and sell $725,000 of first mortgage, 25-year, 7 per cent bonds, to refund a portion of its outstanding bonded indebtedness totalling $963,000. Authority is also asked to issue and sell $500,000 of 7 per cent cumulative, preferred stock to fund a part of the company's present floating debt totalling $629,782.82.

H. A. Lovell Recovering from Recent Illness

Friends of Mr. H. A. Lovell, Long Island representative of the Lovekin Water Heater Company, who was taken seriously ill at Atlantic City during the American Gas Association Convention, will be glad to know that he will return to his home at Laurelton, L. I., shortly after the first of November.

Mr. Lovell was stricken with pneumonia the first day of the convention and was perilously near death during the week. By the doctor's orders, he could not be moved, and has been confined to his room at the Breakers Hotel ever since.

Although very weak from his experience, Mr. Lovell confidently expects, after a short convalescence, to be back on the job in the near future.

Moves Chicago Office

The Chicago office of the Lovekin Water Heater Company has been changed from 15 E. Van Buren street to room 464, People's Gas Building. Mr. R. A. Cameron is district manager of the Chicago territory.

Gas Company to Spend $175,000

Harrisburg, Pa.—Immediate expenditure of $53,645 on new buildings and other items involving a total expenditure of $175,000 in improving the gas plant of the Harrisburg Gas Company has been authorized, General Manager L. S. Williams has announced.

Four new buildings are to be constructed and an addition to another building is planned to meet increased demand. The program when completed will make the plant one of the largest and best equipped plants in this country.

Construction of a complete new boiler house is under way, containing two 300 horse power boilers, with pumps, stacks and all other necessary appurtenances, as well as an overhead coal bunker of 40-ton capacity.

Adjoining the boiler house will be a new one-story building containing wash basins, shower baths, toilets, lockers and a large lunch room for the employees.

In another new building there will be installed three compressors, having a capacity of 300,000 cubic feet of gas per hour. These compressors take the gas from the gas holders and pump it through the distributing system of mains to the suburban territory — Progress, Penbrook, Steelton, Middletown, New Cumberland and Riverside.

A new blower house will be erected and will include machinery incidental to the manufacture of gas. All of the buildings will be constructed of red brick and the interiors are to be finished in white tile wainscoting and red quarry tile flooring.

A fan booster to improve pressure conditions will also be installed in a new additional building to the laboratory.

The contract has been placed with the U. G. I. Contracting Company and the work is progressing rapidly under the supervision of Mr. Williams, and when finished the Harrisburg Gas Company will further assure the fast growing city and surrounding territory uninterrupted efficient service at all times and under almost any condition, officials declare.

To Install New Generator

The Peoples Light Company, Pittston, Pa., has placed order for a new six-foot six-inch water gas generator with cone top and auxiliary equipment with The Gas Machinery Company of Cleveland, Ohio.

The above equipment will go into the building where the two water gas sets formerly furnished by the Gas Machinery Company are installed, and will enable the gas company to take care of its increasing business and continue to render the efficient service that it has given in the past.

New Coal Handling Equipment to Be Installed

The Nashville (Tenn.) Gas & Heating Company is preparing to install an extensive coal handling equipment at its plant. The U. G. I. Contracting Company, Philadelphia, has been authorized to do all the engineering and make the installation.

Company Incorporated

An amended certificate has been filed in the office of the Secretary of State by the Service Appliance Company, Inc., of Schenectady, N. Y., increasing the capital stock of the corporation from $50,000 to $200,000. The company is engaged in the merchandising of gas and electrical appliances and contemplates the opening of branch depots in Troy and Albany. Blodgett & Smith, 437 State street, Schenectady, N. Y., are attorneys for the corporation.

Red Cross Roll Call

The gas and electric interests of New York City are co-operating actively with the Red Cross in its annual roll call, which opens Armistice Day, November 11, and continues until Thanksgiving, for the enlistment of new memberships to maintain the organization's manifold peace-time program of relief and public health work.

Frank W. Smith, vice-president of the United Electric Light & Power Company, 130 East 15th street, heads as chairman a special gas and electric group, formed in accordance with the campaign plan of organizing the entire city into various industrial, mercantile and professional groups to facilitate the roll call effort. A special roll call committee of representative leaders in the gas and electric interests will function under the chairmanship of Mr. Smith to secure the maximum response to the roll call throughout the interests and plans are already under way to reach every person in the interests directly with the Red Cross appeal.

Help for the ex-service man and his family, including legal assistance, loans of money, advice on domestic matters and medical care, disaster relief and a public health program are features of the work in New York for whose maintenance the annual roll call is conducted. The public health program includes the supplying of surgical dressings to 22 local hospitals, nursing service, first aid and work in home hygiene and care of the sick.

Selling Stock to Consumers

Fort Wayne, Ind.—The Northern Indiana Gas and Electric Company of this city is making an intensive drive to sell more of its 7 per cent preferred stock to its patrons and in doing so has recently sent out the following interesting letter to all of its customers:

"Our sale of Class A 7% Preferred Stock, announced a short time ago, has met with general popular response. Already a large number of our customers have become partners. Eventually, we are expecting to have over five thousand people in this and neighboring communities participate in the earnings of this business.

"It is my desire to make sure that EVERY customer of this company understands fully this opportunity to share in the profits of our business. We feel that this will result in a mutual understanding of problems and obligations; and we feel very strongly that it is only fair that the profits of the gas and electric industry should be distributed to a large extent in the communities that make these earnings possible.

"As I say, I want to be sure that every one of our customers understands all of the details in connection with this issue of stock. So, for the benefit of those who have not had the opportunity to get complete information on the Class A Preferred Stock which we are offering, I am enclosing a stamped return post card which, without any obligation on your part, brings to you by return mail an interesting circular. It will tell you in detail all of the most important facts and figures of this rapidly growing company.

"You will find that the company's gross business for twelve months ending July 31st is in excess of $7,000,000; and from all indications will continue to increase year after year. All this means that additional money must be put into this business continually, thus giving to the residents of this community not only a bigger and better public utility, but creating for them a great institution for sound investment of their savings.

"It is of interest to local investors to know that every dollar put into the company through this sale of stock will be spent in Indiana on this property.

"This 7% Cumulative Preferred Stock is being offered at $98.50 a share—for cash or on a liberal partial-payment plan, $10 down and $10 monthly with gas bill.

"We want as wide a distribution of this stock among our customers as possible, therefore subscriptions for a single share are as much desired as larger amounts.

"It will be a pleasure to supply any additional information you may desire on this very important subject.

"Very truly yours,
"S. E. Mulholland, Vice-Pres."

With the letters was sent out a return post card addressed to Mr. Mulholland reading like this:

"Dear Sir:

"Kindly send me your illustrated circular on the Northern Indiana Gas and Electic Company and the Class A 7% Preferred Stock which is now offered to local people. I understand that I am placing myself under no obligation by this request."

There was space on this card for people to sign their names and addresses.

The company is meeting with considerable success in placing its stock with its customers.

Erects New Office Building

Los Angeles, Cal.—Clark Bros. & Libby, local builders and members of the Southern California chapter, Associated General Contractors of America, have just completed a handsome structure at Santa Ana for the Southern Counties Gas Company.

The building is of the colonial style type with brick walls and an exterior finish of stucco and art stone. It contains the administration offices and shops of the company. The cost of erection was $37,000.

Gas Plant to Enlarge

Plans for the construction of a new compressor plant at the Potrero Gas Works, involving the erection of a building eighty-one feet by forty-four feet and the expenditure of $72,000, was announced by the Pacific Gas & Electric Company. The new plant has been made necessary through the increased demand for gas throughout the city, the announcement said.